VIEWPOINT

PERSPECTIVES ON PROSOPAGNOSIA AND MODELS OF FACE RECOGNITION

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INTRODUCTION

The two papers by Bobes et al. (2003, this issue) and by Sperber and Spinnler (2003, this issue) add to the large body of literature demonstrating covert face recognition in prosopagnosia. This viewpoint will offer some perspectives on this interesting phenomenon. First, a re-analysis of the empirical literature will indicate an important misconception concerning the preserved abilities of prosopagnosics. The second section will briefly assess the contribution of Bobes et al. (2003, this issue) and Sperber and Spinnler (2003, this issue) to the debate about the locus, in cognitive terms, of the underlying causal deficit in prosopagnosia with covert face recognition. Both papers make reference to the two main models seeking to explain this phenomenon: the model proposed by Burton and colleagues (Burton et al., 1991; Burton and Young, 1999; Young and Burton, 1999) and that proposed by Farah and colleagues (Farah et al., 1993; O'Reilly and Farah, 1999). Finally, an observation will be offered concerning representations of faces in the Burton et al. (1991) model.

RE-ANALYSIS OF THE LITERATURE

Both Bobes et al. (2003, this issue) and Sperber and Spinnler (2003, this issue) state that their participant performed at chance in a task of deciding which of two simultaneously presented faces was familiar; every trial presented one familiar and one unfamiliar face. Failure in this task is central to the definition of prosopagnosia, that is the inability to gain a sense of familiarity to a known face. Other investigations of densely prosopagnosic participants (see Table I) have reported failure in this task. However, participant FE (Bobes et al.) scored 10/16 = 62.5% correct and participant Emma (Sperber and Spinnler) scored 19/36 = 52.8% correct. No analysis of power was reported in either case, leaving open the possibility that a test with a sufficient number of trials would have yielded performance better than chance.

A review of the literature, presented in Table I, shows that the majority of densely prosopagnosic participants (9/10) scored above 50% correct in this task. For illustration, a one-sample t-test with the chance level of performance set at 50% gives a statistically significant result, $t(9) = 2.07$, $p < 0.04$ (one-tailed),

TABLE I

Percent correct in the task of deciding which of two simultaneously presented faces is familiar; every trial presented one familiar and one unfamiliar face

Source	Case	Percent correct
Bobes et al. (2003, this issue)	FE	63
de Haan, Bauer and Greve (1992)	LF	51
de Haan, Young and Newcombe (1992)	NR	75
Diamond, Valentine, Mayes and Sandel (1994)	ET	53
Newcombe, Young and de Haan (1989)	MS	53
Sergent and Signoret (1992)	PC	44
	PM	54
	RM	58
Sperber and Spinnler (2003, this issue)	Emma	53
Young and de Haan (1988)	PH	51

Note: participants were described as follows: FE "dense prosopagnosia" (p. 44), LF "completely unable to identify familiar people from visual inspection of their faces" (p. 80), NR "identification of familiar faces, whether by naming them or giving appropriate semantic information, was virtually impossible" (p. 147), ET "inability to recognise faces that ought to be familiar" (p. 380), MS "completely unable to recognise familiar faces" (p. 180), PC, PM and RM "severe prosopagnosic" (p. 389), Emma "completely bereft of overt face recognition" (p. 64), PH "completely unable to recognise familiar faces overtly" (p. 320).

mean = 55.5, s.d. = 8.4. The criterion for inclusion in this analysis was that the participant should be unable to gain any subjective sense of familiarity, and unable to provide any semantic information, from visual inspection of the faces of all or virtually all famous people and family members. Thus all the participants had total or near total failure at the early stage of overt familiarity detection as well as the subsequent stage of retrieval of face-related information. To this extent they present a homogeneous group of participants. Although performance is still severely impaired, and is only just above chance, it may have been premature to conclude that densely prosopagnosic participants cannot detect familiarity in a direct test. Such conclusion relies on acceptance of the null hypothesis and this is particularly problematic without an analysis of power.

The performance of participant PH in two-alternative forced-choice tasks of occupation decision (Young, 1998) is also informative. When required to select the politician from a pair of faces comprising one politician and one TV personality, with the faces matched on visual characteristics, performance was 55.6% correct. When required to perform a similar task with just 10 faces repeated 20 times, PH achieved 52% correct. When asked to decide whether faces belonged to members of the research team or not, PH scored 50% and 56.25% in two repetitions of the task. Although none of these individual results differs from chance in a binomial test, a one-sample t-test on the set of results is very near significance, $t(3) = 2.33$, $p = 0.051$ (one-tailed), mean = 53.46, s.d. = 2.97. The implication is that it may be unwise to draw a conclusion from a single task, and participant PH may be able to detect occupation in a direct test.

In the light of the suggestion of partially preserved covert familiarity detection it is relevant to examine whether the reported simulations indicate this ability (Burton and Young, 1999; Farah et al., 1993; O'Reilly and Farah, 1999; Young and Burton, 1999). It appears that neither simulation clearly demonstrates above chance performance in two-alternative forced-choice tasks of familiarity detection. In the Farah et al. (1993) simulation it is proposed that familiarity may